

Carnegie Mellon University

Annual Progress Report: 2006 Formula Grant

Reporting Period

July 1, 2010 – December 31, 2010

Formula Grant Overview

The Carnegie Mellon University received \$649,424 in formula funds for the grant award period January 1, 2007 through December 31, 2010. Accomplishments for the reporting period are described below.

Research Project 1: Project Title and Purpose

Predicting 3D Protein Structures - Automated structural prediction for tertiary and quaternary protein folding, and finding corresponding coding motifs in the DNA sequence are crucially important in computational molecular biology. This research will develop algorithms and software to identify the multiple peptide sequences in multiplexed tandem mass spectroscopy spectra through database searching and will develop approaches for comparing collections spectra representing different states of complex proteomes, including disease states. Our intent is to make sufficient progress that would permit us to seek larger funding from NIH, NSF, and perhaps DOE or the pharmaceutical industry.

Duration of Project

7/1/2007 – 11/30/2008

Summary of Research Completed

This project ended during a prior state fiscal year. For additional information, please refer to the Commonwealth Universal Research Enhancement C.U.R.E. Annual Reports on the Department's Tobacco Settlement/Act 77 web page at <http://www.health.state.pa.us/cure>.

Research Project 2: Project Title and Purpose

Computational and Neural Mechanisms of Object Vision - The purpose of this project is to test the idea that the visual cortex of the primate brain adjusts in response to experience so as to represent with maximal efficiency the things that have been seen. We will test this idea by using two kinds of images: natural scenes and faces. In each case, we will carry out parallel computational and electrophysiological studies. The computational studies will assess what features of natural scenes and faces carry the most information. The electrophysiological studies will test the idea that neurons in the visual cortex selectively represent these informational features.

Duration of Project

1/1/2007 – 12/31/2009

Summary of Research Completed

This project ended during a prior state fiscal year. For additional information, please refer to the Commonwealth Universal Research Enhancement C.U.R.E. Annual Reports on the Department's Tobacco Settlement/Act 77 web page at <http://www.health.state.pa.us/cure>.

Research Infrastructure Project 3: Project Title and Purpose

Research Infrastructure Support for the Center for the Neural Basis of Cognition - This research infrastructure project is for renovation of 1,000 sq. ft. of space in the Mellon Institute (Room 134B) adjacent to the current quarters of the Center for the Neural Basis of Cognition (CNBC). This space will be converted to offices and laboratories that are badly needed to meet the needs of currently cramped CNBC faculty, postdoctoral researchers and students.

Duration of Project

1/1/2007 – 12/31/2010

Project Overview

The broad objectives of the CNBC are to: 1) work jointly with allied departments at each university to recruit and support the activities of outstanding researchers working on the neural basis of cognition, including development and disorders; 2) train outstanding graduate students and post-doctoral fellows so that they can carry on the research of the center in their future careers; and 3) provide mechanisms for fostering interactions and exchange of ideas among faculty, post-doctoral fellows, and graduate students.

This research infrastructure project is aimed primarily at supporting the latter two of CNBC's objectives. Successful completion will add 1000 square feet of space that will be used by students and post-docs of three of the center's investigators, fostering collaborations through the natural interactions that occur by co-location. The work those personnel will perform in the renovated space will be primarily computational data analysis, i.e., dry lab work, though a portion of the space will be configured to accommodate wet lab experimentation. The renovation plan has flexibility of space purpose built in. As such, should the opportunity and need arise, we can quickly re-purpose the space for use by the new Carnegie Mellon CNBC Co-Director, if he/she is hired (an active search is in progress) in a timeframe coincident with this project's schedule.

Rough plans and cost estimates for the renovation are in hand. Tasks to be performed in this project include letting the project out for bid, reviewing contractors' detailed proposals and price estimates, selecting a contractor and negotiating the contract, review and approval of final plans and drawings, removal of the existing ventilation system, construction of walls, installation of

service lines, painting and flooring, certification of completion by the Carnegie Mellon Office of Campus Design and Facility Development, and purchase and installation of laboratory and office furniture.

Principal Investigator

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Other Participating Researchers

None

Expected Research Outcomes and Benefits

CBNC's facilities on the Carnegie Mellon campus are located on the first floor of the historic Mellon Institute building. Because of its success, CNBC has become cramped for space; laboratory space is especially at a premium. Upon completion of this project, the CNBC will have additional laboratory space to accommodate as many as 10-12 student and post-doctoral researchers. The planned subdivision of the 1000 square foot space, currently an outdated glass blowing shop, is for one 200 sq. ft. wet/dry lab and four 150-160 sq. ft. computational labs.

The new space will facilitate the work of three CNBC investigators based at Carnegie Mellon; it should also support occasional use by two CNBC investigators based at the University of Pittsburgh. An important benefit of the planned layout is that it will co-locate researchers, thus promoting interactions among research teams that inevitably lead to new collaborative research projects.

Summary of Research Completed

Per this project's original goals, we have successfully completed renovations to a heretofore unusable and uninhabitable space on the 1st floor of Mellon Institute within the CNBC's allocated space. This renovation project was quite extensive and involved asbestos removal, installation of a new ventilation system, new lighting, and new service lines, as well as the construction of walls, a drop ceiling, new flooring and other "build out" needs. The renovations were done in a manner consistent with our ultimate goal to repurpose this space for offices and laboratories as CNBC grows through new faculty hires in the areas related to the study of the human mind and brain. With the arrival of a new director, the CNBC now has 5 allocated faculty lines to fill in the coming years. With the space renovated through the support of this project the CNBC is now in a position to create need-appropriate laboratories and offices depending on experimental techniques employed by each new faculty hire. In the interim, the renovated space is being used as additional teaching space for CNBC related courses. Because of the overall size of the room and the highly limited nature of similar space on Carnegie Mellon's campus, we now

have the important new capacity to host courses with 60+ students, allowing us to offer courses without enrollment limits. The space is also used for scientific seminars and other CNBC-related scientific meetings. In sum, this project has been successfully completed in a manner that facilitates CNBC's scientific and training missions for both the short-term and the long-term.

Research Project 4: Project Title and Purpose

Risk and Addiction in Smoking - The purpose of this project is (1) to assess how perceptions of addiction moderate adolescents' reported willingness to try tobacco, and (2) to explore the relationship between their perceptions of the risk of smoking and risk of addiction. This project will draw on work showing that people over-estimate the risks of smoking, as they do with most other risky health behaviors, as well as work showing that people see their own risk as lower than other people's risk. We plan to illuminate this apparent contradiction by showing the role of *perceptions of addiction risk* in determining smoking behavior, through their effect on the perceived relevance of smoking risks. We believe that making addiction risk real to adolescents can enhance the effect of anti-smoking education. However, doing so requires conveying the phenomenology of an inherently unfamiliar state.

Duration of Project

7/1/2007 – 6/30/2010

Summary of Research Completed

This project ended during a prior state fiscal year. For additional information, please refer to the Commonwealth Universal Research Enhancement C.U.R.E. Annual Reports on the Department's Tobacco Settlement/Act 77 web page at <http://www.health.state.pa.us/cure>.